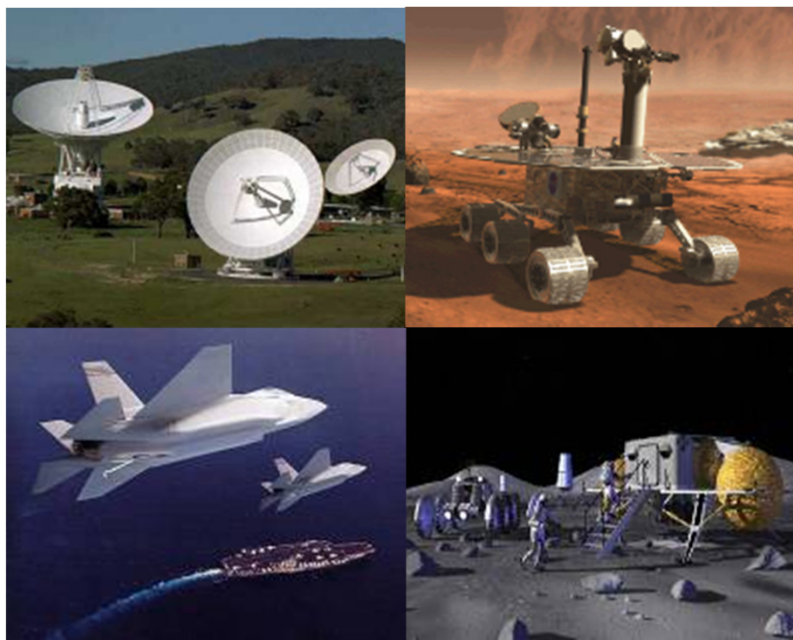


Information Sharing through Automated Negotiation

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Challenge



-
- Information sharing between organizations needs more than just common information model or ontology.
 - Even with federated identity management system, trust relationship is often context-based.
 - Extensive human interactions is needed to make information sharing decisions.
 - Needs a way to speed up the information sharing negotiation process to minutes or seconds.
 - Automated negotiation is a NP-hard problem often involves billions of possibilities.

JPL Policy Negotiation Engine



Introducing Rules

Name

Types of Rules

Introducing Variables

Introducing Priority Relations

Pseudo-English Form of Rules

The screenshot displays the 'Defeasible Logic Policy Interface' window. It features a menu bar with 'File', 'Mode', and 'Policy View'. The main area is divided into several sections: 'Rule Definition' with an 'Add Blank Rule' button; a 'Rule:' dropdown set to 'R0'; a 'Conditions:' text area; a 'Relationship:' dropdown with a menu open showing options like 'will be', 'would like to be', and 'don't want to be'; a 'Result:' dropdown set to 'using A_Satisfied_Policy'; and a list of conditions containing 'A_Satisfied_Policy'. Below this is a 'New Item:' input field. At the bottom left, the 'Priority Definition' section includes 'Superior Rule:' and 'Inferior Rule:' dropdowns (both set to 'R0') and an 'Add Priority' button. On the right, the 'Policy Definition' section shows a list of rules with 'R0: will be using A_Satisfied_Policy' selected. A 'Priorities:' section is also visible at the bottom right. Arrows from the surrounding text labels point to specific elements: 'Introducing Rules' points to the 'Rule Definition' section; 'Name' points to the 'Policy Title' field; 'Types of Rules' points to the 'Relationship:' dropdown; 'Introducing Variables' points to the 'Conditions:' text area; 'Introducing Priority Relations' points to the 'Superior Rule:' dropdown; and 'Pseudo-English Form of Rules' points to the rule list on the right.

Policy Editor



Deceasible Logic Policy Interface

File Mode Policy View

Policy Title:

Rule Definition

Add Blank Rule

Rule: Conditions: Relationship: Result:

Above: Use these boxes to select how the conditions should affect the result, and what that result should be.

Left: The conditions for the rule are displayed here as a list of predicates which will be ANDed together. Use the buttons below the box to add conditions from the list of

Add Positive Add Negative

Add an item to this box to use it as a condition or result.

A Satisfied Policy

- negotiate
- steo(n)
- steo(n+1)
- bandsatisfied
- wavesatisfied

New Item: <--Type in an item here and hit ENTER to add it to the list above

Priority Definition

Superior Rule: > Inferior Rule: Add Priority

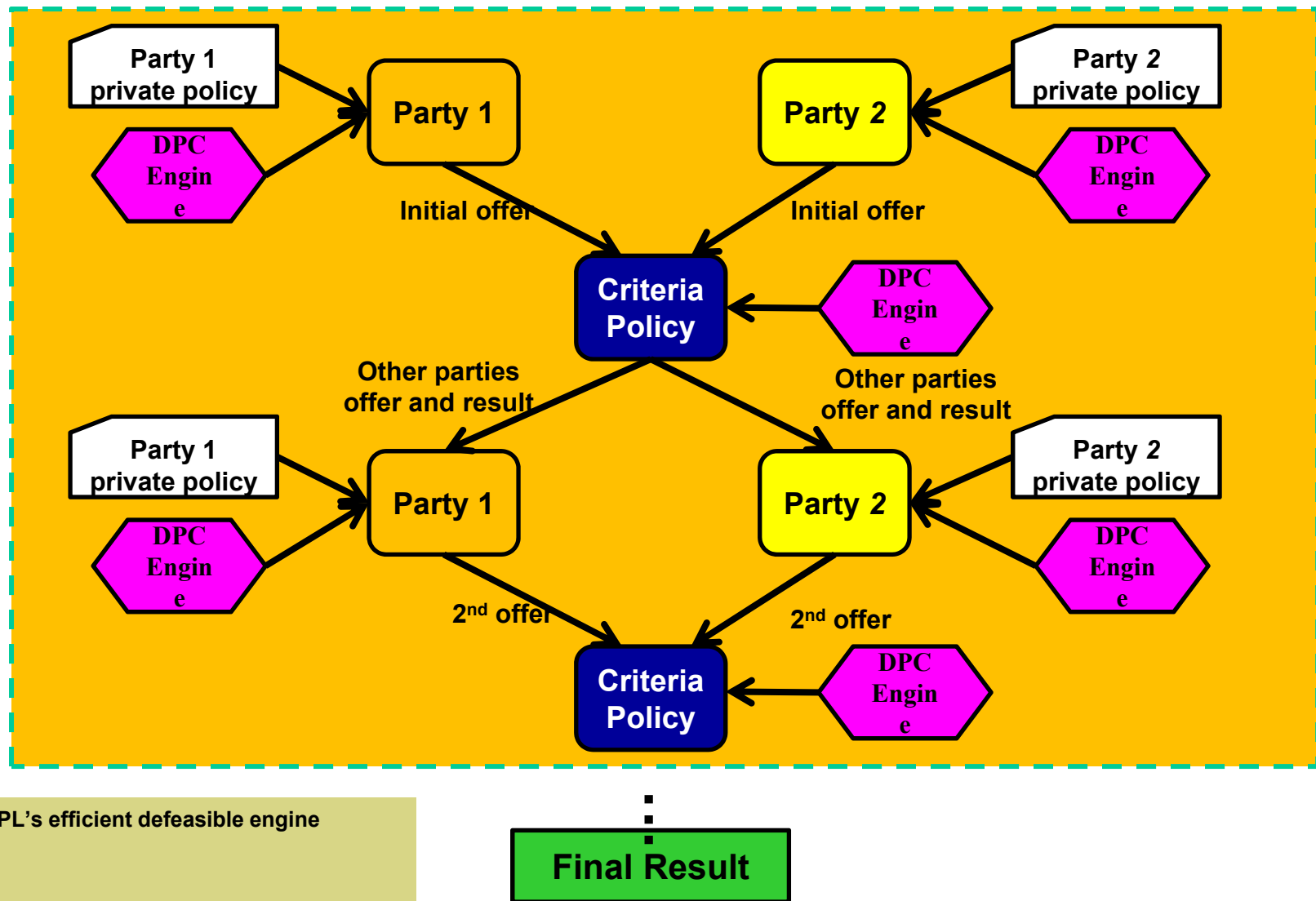
Policy Definition

Policy:

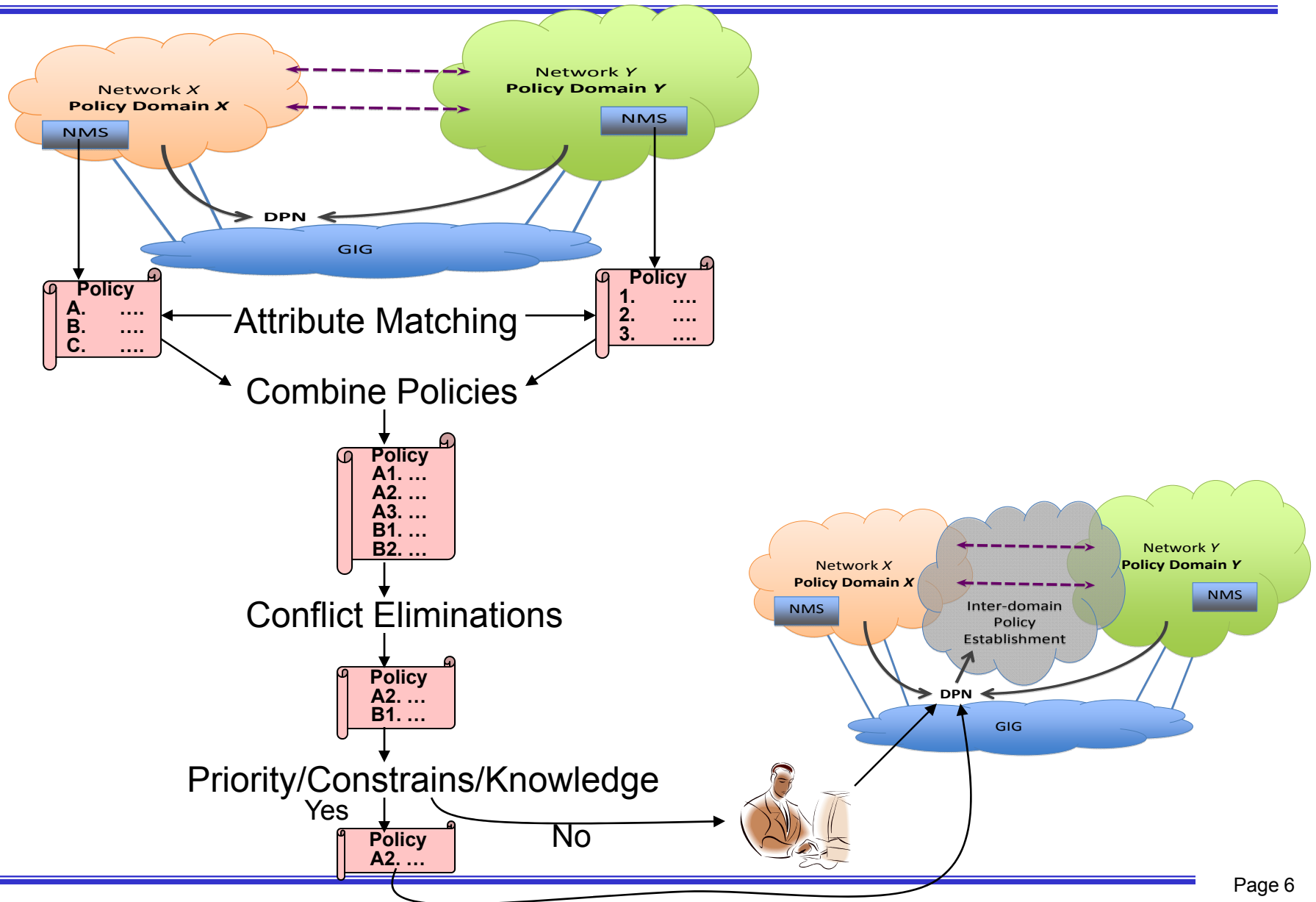
```
<Rulebase>
  <oid> "TestPolicy" </oid>
  <Atom>
    <oid> "R0" </oid>
    <Rel> "Rule" </Rel>
    <arg> "DEFEASIBLE" </arg>
  </Atom>
  <Implies>
    <oid> "R0" </oid>
    <Body>
      <And>
        <And>
        </And>
      </Body>
    <Head>
      <Atom>
        <Rel> "using" </Rel>
        <arg> "negotiate" </arg>
      </Atom>
    </Head>
  </Implies>
  <Atom>
    <oid> "R1" </oid>
    <Rel> "Rule" </Rel>
    <arg> "DEFEASIBLE" </arg>
  </Atom>
  <Implies>
    <oid> "R1" </oid>
  </Implies>
</Rulebase>
```

Exporting to RuleML format

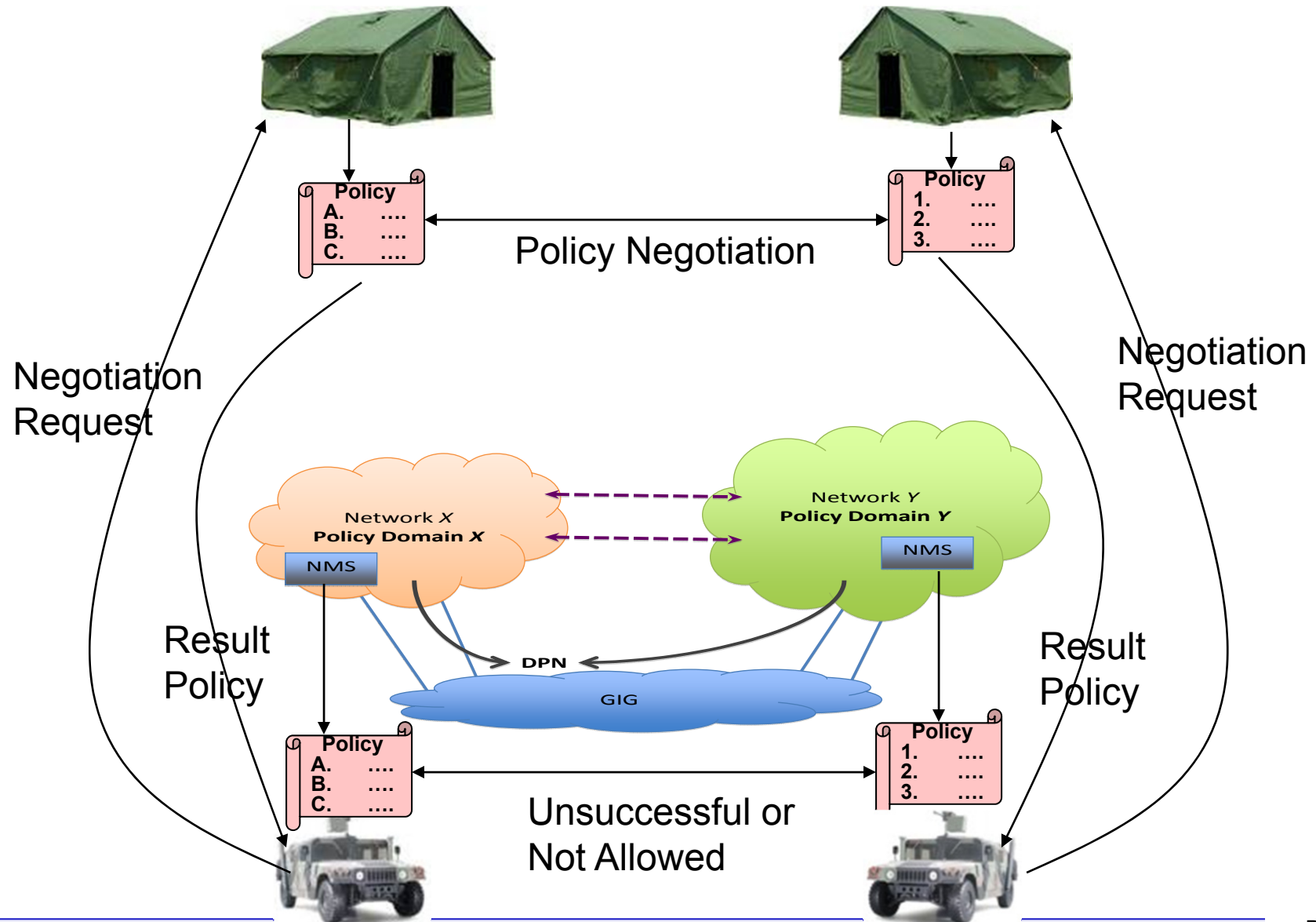
Multi-Round Policy Negotiation Process



Inter-Organization Dynamic Policy Negotiation Process



Hierarchical Dynamic Policy Negotiation Process



Summary



-
- Dynamic policy negotiation enables real-time information sharing decision making.
 - Dynamic policy negotiation enables building of trust based on the current context.
 - Dynamic policy negotiation provides a new tool in sharing critical information in real-time for cyber security.